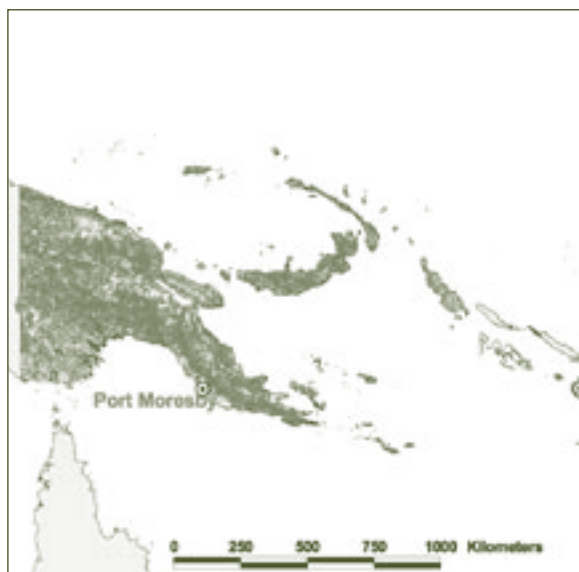


PAPUA NEW GUINEA



* For legend see page 58

Forest resources

Papua New Guinea (PNG) has a land area of 46.3 million hectares and a population of 5.5 million people. It consists of over 600 islands and atolls in four major groups: the eastern half of the island of New Guinea, New Britain, New Ireland and Bougainville. The western half of the island of New Guinea is a province of Indonesia; to the south it is separated from Australia by the Torres Strait. A spine of mountains, the Owen Stanley Range, runs east to west; the country's highest peak is Mt Wilhelm, rising to 4,510 m above sea level. On both sides of the mountain chain are fertile plains, flooded deltas, mangrove swamps and broad sandy beaches.

PNG's forest area was an estimated 30.6 million hectares in 2000, which is 67.6% of the total land

area (FAO 2005a), evenly distributed across the country. PNG has the largest area of forest among the island countries of the South Pacific.

Forest types. The forests are varied, stretching from sea-level to the tree line at an altitude of over 4,000 m. Forests can be broadly classified into: rainforest (80%), moist forest (4%), savanna and woodland (5%) and montane forest (11%)^a. The rainforests may be sub-divided into coastal, lowland and hill forests. Typical tree species are: in the coastal-littoral forests, *Terminalia* spp, *Melaleuca* spp and *Pterocarpus* spp; in the lowland rainforest, species of *Alstonia*, *Calophyllum* and *Pometia*; in the hill rainforests, species of *Canarium*, *Celtis* and *Hopea*; and in the mountains, species of *Araucaria*, *Agathis*, *Lithocarpus* (oaks) and *Nothofagus* (southern beech). Another important species is *Eucalyptus deglupta*.

Dynamics of forest resource change. Forest cover declined at an estimated annual rate of 113,000 hectares (0.4%) between 1990 and 2000 (FAO 2005a).

Permanent forest estate. The determination of a PFE is difficult under the customary land ownership that applies in PNG. The estimates given in Table 1 are based on the areas set aside by the government for timber development or reserved for protection^a.

Planted forests. The area of forest plantations at the end of 1999 was an estimated 58,000 hectares, comprising government plantations of 22,800 hectares and private plantations of 35,200 hectares (PNG Forest Authority 2002). Given that the present rate of planting is an estimated 4,000 hectares per year^a, the current total area might be about 80,000 hectares. There are also about 20,000 hectares of *Hevea brasiliensis* (rubber) (FAO 2001).

Table 1 PFE

Estimated total forest area (million hectares)	Total closed natural tropical forest ('000 hectares) Source: FAO 2001	PFE ('000 hectares)			
		Production		Protection	Total
		Natural	Planted		
30.6	30,150	8,700 ^a	80 ^d	1,700 ^a	10,480

Institutional arrangements

Forest tenure. Customary land ownership is guaranteed by the PNG constitution and is the key factor influencing the use of the forest. Ninety-seven per cent of the land is held as communal or clan commons; there is also individual/private ownership of land. There are a large number of clans and tribes, speaking more than 800 languages. Customary rights include rights to all natural resources, with the exception of minerals, petroleum, water and genetic resources. Landowner groups are legally entitled to be involved actively in decisions concerning the management of their forest land.

SFM policy framework. PNG's national forest policy was approved in 1991. The country has also adopted ITTO's C&I as a monitoring tool for SFM.

Forest policy and legislation. The main objectives of the national forest policy are: (i) the management and protection of the nation's forest resources as a renewable natural asset; and (ii) the utilization of the nation's forest resources to achieve economic growth, employment, greater Papua New Guinean participation in industry, and increased viable onshore processing. Parallel to the development of this policy, the National Forests and Conservation Action Plan was prepared and officially approved in 1996. Three sub-policies linked to the national forest policy were released in 2003: an ecoforestry policy; a reforestation policy; and a downstream-processing policy.

The legal authority for the various recommendations of the national forest policy and the measures to achieve them are contained in the following instruments: the Forestry Act (1991, as amended in 2000); the National Forestry Development Guidelines (1993); the Planning, Monitoring and Control Procedures for Natural Forest Logging Operations (1995); the Key Standards for Selection Logging in Papua New Guinea (1995); the PNG Logging Code of Practice (1996); the National Forestry Plan (1996); Procedures for Exporting Logs (1996); and Forestry Regulation (1998). PNG has established a number of regulatory instruments to support SFM; there are, however, some gaps in implementation. Other legal instruments relevant to forestry are: the Land Groups Incorporation Act (1974); the PNG Labour Law (1990); and the Environmental Act (2000).

Institutions involved in forests. The PNG Forest Authority was created in 1991 under the provisions of the Forestry Act. It succeeded the former Department of Forests, the 19 provincial forest divisions and the Forest Industry Council and was established as a statutory corporation with regulatory and administrative responsibility for the management of the forest sector throughout the country. In 2001, it had a total staff of over 600, including about 430 with diplomas or university degrees^a. The Forest Authority comprises the National Forest Board (NFB) and the National Forest Service (NFS), and a number of regulatory and administrative responsibilities have been delegated to the provincial level. The Board operates through a system of specialist advisory committees and provincial forest management committees which are serviced by the NFS. The PNG Forest Research Institute is a specialized agency falling under the purview of the PNG Forest Authority. The PNG Forest Industries Association is an incorporated national association representing and promoting the interests of the PNG forest industry. Monitoring and surveillance of the log trade is carried out under contract by SGS of Switzerland. The Department of Environment and Conservation is responsible for the administration of protected areas and also has a monitoring role with respect to adherence to environmental regulations.

A 'landowner company' (LOC) concept was developed as part of the national forest policy in order to increase national participation in forestry. However, many of the LOCs have been plagued by mismanagement and in-fighting between different landowner factions, with the result that many have become alienated from the people they were supposed to represent. LOCs, as licence holders, contract foreign companies to conduct logging. It was expected that these companies would train the landowners and make them capable of running their own businesses, but such a development has not yet taken place. The main problems are the lack of education and business knowledge on the part of most landowners, difficulties in successfully structuring the LOCs due to the complex land tenure system, and the proliferation of landowner groups (Filer & Sekhran 1998).

A number of international NGOs (eg WWF, Conservation International, The Nature Conservancy) and national NGOs and religious bodies are active in the area of social welfare *vis-à-vis* forestry. National and international NGOs have taken a lead in the development of ecoforestry initiatives. They also have programs to train landowners in SFM.

Status of forest management

Forest for production

According to the 1991 Forestry Act (Section 56) the government may acquire timber rights from customary owners pursuant to a forest management agreement (FMA) between the customary owners and the government. The National Forest Development Guidelines issued in 1993 specify that the customary land over which an FMA has been negotiated and a timber permit issued should be managed so as to maintain or improve the forest's capacity to produce timber and other commercial forest products on a sustained-yield basis, subject to environmental protection standards, and with opportunities provided for meaningful participation by the customary owners, while maintaining future development options. The PNG Logging Code of Practice and Key Standards for Selective Logging in PNG also provide specifications and prescriptions for reducing the impact of logging.

Before the promulgation of the Forestry Act, timber rights were acquired by a process referred to as timber rights purchase. The rights acquired under this system were only for the harvesting of merchantable timber and did not transfer to the state or concessionaires the responsibility of forest management. The national forest policy confirmed the government's intention to proceed with the acquisition of timber rights and to provide for their long-term management. Through an FMA the PNG Forest Authority secures a commitment from the resource owners to follow recommended forest management practices while simultaneously offering investors access to the forest for a minimum of 35 years. Implementation may involve the state in issuing a timber permit, under which it manages the forest on behalf of the customary owners for the duration of the FMA. The management roles of the state, including timber harvest and construction

of infrastructure, can be implemented through an investor with the consent of the customary owners through an FMA. Management responsibility can also be delegated to legally established LOCs. The FMA should specify the returns due to the landowner.

As of 2003, the PNG government had acquired timber rights from the customary owners for about 5.0 million hectares of forest (generally through 50-year timber lease arrangements)^a. The rights acquired are normally allocated to foreign developers who have the necessary financial capabilities.

There are, however, concerns about the manner in which timber concessions are awarded and controlled, particularly about area approval, resource inventory, the determination of the appropriate cutting cycle, the management of fragile forests and conservation set-asides, and the treatment of landholder involvement^c. It is difficult to ensure the integrity and security of the PFE, since landowning (and land-claiming) communities do not recognize rigid boundaries and controls. Local villagers are expanding their shifting cultivation into natural forest, including parts subjected to logging or opened up by the construction of new roads. All state-acquired timber concessions are supposed to be implemented according to RIL prescriptions, but post-harvest surveys have not been carried out in the majority of these forests, and the remoteness of many operations means that monitoring is often lacking^a. In general, a lack of resources is constraining the achievement of SFM by limiting the extent of field visits that can be made for monitoring purposes and also by reducing staff in the Forest Authority and the Department of Conservation and Environment^a.

Silviculture and species selection. The silvicultural system prescribed for natural forests is selective logging, involving the removal of mature and over-mature trees to allow the remaining crop to grow naturally to maturity. Even though the pre-FMA (prior to 1991) system was also described as selective logging, all trees above the prescribed limit in a management unit were cut over within 10–20 years (ie less than the planned felling cycle), thus consuming the resource faster than could be sustained. From 1991–92 onwards, all new forestry operations have had an assigned cutting cycle of 35 years. Bringing projects started

Table 2 Some commonly harvested species for industrial roundwood (2001–02)^c

Timber species	Remarks
<i>Pometia pinnata</i> (taun)	The relative abundance of the species varies from locality to locality. No data are readily available about their relative importance at the national level.
<i>Intsia bijuga</i> (kwila)	
<i>Eucalyptus deglupta</i>	
<i>Calophyllum</i> spp	
<i>Anisoptera thurifera</i>	

before 1991 into line with the new requirements will require a substantial reduction in the permitted harvest levels and smaller projects to be consolidated into larger, economically sustainable projects.

The tropical forests of PNG consist of a heterogeneous mixture of some 200 tree species. Based on quality and market acceptability, these species have been categorized into four groups for fixing royalties and charges. In addition to those listed in Table 2, important species harvested include *Intsia bijuga* (kwila), *Pometia pinnata* (taun), *Pterocarpus indicus* (rosewood), *Calophyllum* spp, *Celtis* spp, *Canarium indicum*, *Dillenia papuana*, *Terminalia* spp, *Buchanania* spp, *Palaquium* spp and *Homalium foetidum* (Table 2).

Planted forest and trees outside the forest.

Eucalyptus deglupta, an indigenous species, is the main planted tree, along with *E. grandis*, *Acacia mangium*, *Tectona grandis*, *Terminalia brassii*, *Pinus caribaea*, *P. patula*, *Ochroma lagopus* and *Octomeles sumatrana*.

Forest certification. PNG has a national FSC working group and has developed national certification standards. The extent of FSC-certified forest area in PNG so far is one area of 19,215 hectares consisting of semi-natural and mixed plantation forest, and natural forest (FSC 2005).

Estimate of the area of forest sustainably managed for production. Management plans have been prepared for an estimated area of just under 5 million hectares of production forest^a, at least 1.5 million hectares of which are considered managed sustainably and are expected to undergo certification in the near future^c (Table 3).

Timber production and trade. In 2003, PNG produced an estimated 7.2 million m³ of roundwood, of which about 76% (5.5 million m³) was fuelwood

for domestic use (FAO 2005b). Total industrial tropical log production was an estimated 2.30 million m³ in 2003, up from 2.10 million m³ in 1999 (ITTO 2004, 2005) and well below the estimated sustainable yield^a of 4.7 million m³. The forest industry is predominantly based on log exports; an estimated 2.02 million m³ of tropical logs were exported in 2003 (up from 1.98 million m³ in 1999) (ITTO 2004, 2005), which makes PNG the world's second-largest exporter of tropical logs after Malaysia. PNG earned US\$126 million in 2003 from exports of tropical timber, US\$109 million of which were from logs (ITTO 2005).

The national forest policy anticipates increased domestic processing of forest products to create employment, facilitate the transfer of technology and promote the export of value-added products. However, little progress has been made so far in this regard. The principal export markets for logs in 2003 were China (62% of all log exports), Japan (20%) and Korea (9%) (ITTO 2005).

Non-wood forest products. The people of PNG make use of many NWFPs for their livelihoods and consume wild meat, wild tubers, medicinal plants and other produce on a daily basis. Butterflies, live birds, eagle wood, *Santalum* (sandalwood) and rattan products are important sources of local income. An average 13 tonnes of sandalwood are exported each year^a. Despite the significant value of and community dependence on NWFPs, there appear to be no firm government policies towards them.

Forest for protection

Soil and water. PNG's rugged terrain and steep slopes mean that soil and water conservation will always be important. The Logging Code of Practice, which is applied to state-acquired concession areas, includes measures for the protection of water and

Table 3 Management of the production PFE ('000 hectares)

Total	Natural			Planted			
	Allocated to concessions/ under licence	With management plans	Certified	Sustainably managed	With management plans	Certified	
8,700	5,600	4,980 ^a	19 [*]	1,500 ^c	80	n.d.	0 [*]

* The single area of mixed semi-natural, plantation and natural forests has been counted as 'natural' here

soil resources, but these are not always strictly followed. No data are available on the extent of catchment protection forests.

Biological diversity. New Guinea is one of the most floristically rich islands on the planet. An estimated 20,000 species of higher plants have been found – about 7.5% of the world's total number of higher plant species. The world's greatest diversity of orchids (over 2,000 species) and a similar number of fern species occur there. PNG also contains important representatives of the flora of the ancient super-continent Gondwanaland, including a large contingent of southern conifer species and *Nothofagus* (southern beech). Fifty-eight mammals, 33 birds, ten reptiles, ten amphibians and 142 plants are listed as critically endangered, endangered or vulnerable on the IUCN red list of threatened species; of these, 22 mammals, 29 birds, ten amphibians and one plant are found in forests (IUCN 2004). Seven plants are listed in CITES Appendix I and 254 in Appendix II (CITES 2005).

Protective measures in production forests. There are regulations for commercial forestry operations in order to protect catchments and prevent soil erosion. As noted earlier, however, the enforcement of these is often problematic.

Extent of protected areas. At present there are 33 government-declared protected areas in wildlife management areas, national parks and nature reserves^a. According to UNEP-WCMC (2004), 362,200 hectares of forest are in protected areas that conform to IUCN protected-area categories I–IV, including 322,000 hectares of lowland evergreen broadleaved rainforest.

Estimate of the area of forest sustainably managed for protection. Details are scanty about the system of protected areas and their condition.

Insufficient information was available for an estimate to be made of the area of protection PFE managed sustainably.

Socioeconomic aspects

Economic aspects. Forestry contributed US\$334 million to PNG's GDP in 2001^a, which was about 76% of total GDP. Recent information on employment provided by the forestry sector was not available for this report^a. The government collects revenues from a log export tax and a reforestation levy, while resource owners receive a royalty on timber harvested (10 kina per m³) and other levies and premiums^a. However, it has been observed that many of the benefits of forestry operations have generally not filtered through to landowners, and income has not been saved or invested to ensure long-term development (PNG Forest Authority 2002).

Livelihood values. About 80% of the PNG population is rural and uses forests to meet a wide range of subsistence needs, including food, fuel, shelter, medicines and cultural aspects, as well as to supply land that is used in shifting agricultural systems. No quantitative information was made available for this report.

Social relations. Customary landowners participate in the processes by which the Forest Authority purchases timber rights but are not much involved in the subsequent management and development of the resources^a. The purchase of rights usually involves payments or royalties and levies to landowner groups, which has led to conflicts and tensions within such groups. The presence of logging camps (and the associated disruptions to social and cultural environments) has also created tensions in some communities^c.

Table 4 Management of the protection PFE ('000 hectares)

Total	Attributed to IUCN categories I-IV	Allocated for soil and water	With management plans	Managed sustainably
1,700	362	n.d.	n.d.	n.d.

Summary

Two-thirds of PNG is under forest cover and the official timber harvest is well below the estimated national sustainable timber yield. On average, each citizen has rights over about 6.4 hectares of forest. However, the majority of people still live in extreme poverty. The challenges are substantial if SFM is to be achieved. Key among them would appear to be: reducing the social and cultural disruption of logging; increasing the benefits to local development of forest management; and increasing the allocation of resources to the monitoring of logging activities and the implementation of forest policies at the national level.

Key points

- Customary land ownership is guaranteed by the PNG constitution and is the key factor influencing the use of the forests; 97% of the land is held as communal or clan commons.
- The determination of a PFE is difficult in PNG given its land-tenure system. Nevertheless, ITTO estimates that the country has about 10.5 million hectares of forest that might be considered permanent; these include 8.7 million hectares of forest over which timber rights have been acquired (production PFE), 1.7 million hectares allocated for protection and about 80,000 hectares of timber plantations.
- At least 1.5 million hectares of natural-forest production PFE are estimated to be managed sustainably. No estimate could be made of the extent to which the protection PFE is so managed.
- The PNG Forest Authority was established in 1991 by the Forestry Act as a statutory corporation with regulatory and administrative responsibility for the management of the country's forests.

- A 'landowner company' concept was developed as part of the 1979 national forest policy in order to increase national participation in forestry. However, this has not been wholly successful.
- PNG is a major exporter of tropical logs, shipping out an estimated 2.02 million m³ in 2003 to China, Japan and other mostly Asian destinations.
- The government collects revenues from a log export tax and a reforestation levy, while resource owners receive a royalty on timber harvested (10 kina per m³) and other levies and premiums.
- Customary landowners participate in the processes by which the Forest Authority purchases timber rights but are not much involved in the subsequent management and development of the resources.

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